



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/973,685

10/09/2001

Constantin C. Stancu

GP-300969

5761

7590

01/10/2005

CHRISTOPHER DEVRIES

General Motors Corporation

Legal Staff, Mail Code 482-C23-B21

P.O. Box 300

Detroit, MI 48265-3000

EXAMINER

SCHEUERMANN, DAVID W

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/973,685	STANCU ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	David W. Scheuermann	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 May 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al., US 5936378 in view of Nagate et al., US 5864192. Iijima et al., US 5936378 discloses:

An electric motor control system comprising:

- a stator (1U, 1V, and 1W; see figure 1) for producing a magnetic field;
- a surface mount permanent magnet rotor rotated by said magnetic field;
- a motor shaft (inherent) coupled to said rotor;
- power electronics for controlling said magnetic field in said stator;
- wherein said power electronics controls the q-axis and d-axis current components for the electric motor (control box 50 in figure 1); and

Art Unit: 2834

a controller controlling said power electronics (Gain Production Unit 40, figure 1), said controller including a control block to control the d-axis current as a function of the angle  $\beta$ .

In block 114, of figure 18 of Iijima et al. show that  $I_d$  is a function of the variable  $G_{ai}$ . In column 16, lines 42 - 55,  $G_{ai}$  is clearly defined as a function of the angle  $\beta$ , as set forth on line 55. Since  $I_d$  is a function of  $G_{ai}$  and  $G_{ai}$  is a function of angle  $\beta$  it follows that  $I_d$  is also a function of angle  $\beta$ .

Iijima et al., US 5936378 does not expressly disclose the limitation "... to control the d-axis current as a function of the angle  $\beta$  when said permanent magnet rotor is in magnetic saturation". Nagate et al., US 5864192 discloses using rare earth magnets in the rotor to cause magnetic saturation thereof, for the purpose of improving motor reliability, note column 16, lines 38-44. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use the rare earth magnets of Nagate et al., US 5864192, in the rotor of Iijima et al., US 5936378, along with the mating magnetic sensor. One of ordinary skill in the art would have been motivated to do this to improve motor reliability and facilitate assembly by increasing the axial distance between the magnetic sensor and the rotor end face.

As to claim 4, note the inverter within control block 10 of figure 1 of Iijima et al., US 5936378.

As to claim 5, note that total torque exhibits a non-linear behavior as shown in figure 21 by the arcuate relationship between the total torque and the angle  $\beta$  when the d-axis current is controlled as a function of angle  $\beta$ .

Art Unit: 2834

Re claim 6, see block 118 of figure 18 of Iijima et al., US 5936378.

Re claim 10,  $\beta$  is shown as the angle between the stator current vector with reference to the q-axis in figure 20. Also see figure 21, which inherently teaches the relationship between angle  $\beta$  and torque.

As to claim 11 and 12, note that the magnetic sensor, which mates with the rare earth magnets, would inherently operate to determine the position of the rotor while current sensor 2U determines the actual current of the electric motor.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2834

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David W. Scheuermann whose telephone number is (703) 308-9637. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached at (571) 272-2044. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

dws

December 27, 2004

  
**DARREN SCHUBERG**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800